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ASH GROVE CEMENT WEST, INC.

6720 S.W. MACADAM AVE. SUITE 300
PORTLAND, OREGON 97219-2312
(503) 293-2333

April 15, 1991

Mr. Don Merlino
Stoneway Concrete, Inc.
1915 Maple Valley Hwy.
Renton, WA 98055-3906

RE: **PLANT DRAINAGE**

Dear Don:

Attached is a letter from Klein Consulting which outlines our options for solving the drainage pond problems at our Seattle cement plant. After you have had time to review the report, we should meet to decide what action we should take.

Please let me know when you will be available.

Very truly yours,

ASH GROVE CEMENT WEST, INC.

RECooke

Richard E. Cooke
Vice President/Operations

Attachment

c: George Wells

KLEIN CONSULTING ENGINEERS, INC.
Civil Engineers/Planners/Surveyors
P. O. BOX 808
1928 Council Street Forest Grove, OR 97116
503 / 359-5956

April 11, 1991

Ash Grove Cement West
Portland, Oregon

Attn: Richard Cooke

Re: Ash Grove Cement West Seattle Plant Drainage

Dear Mr. Cooke:

This letter presents our findings relative to alternative stormwater/waste water disposal options at your Seattle plant. In particular, we have analyzed the feasibility of discharging stormwater runoff and various on-site process waters into the public conveyance system located in East Marginal Way South. The following summarizes this analysis, and provides an estimation of costs associated with both this option and the drywall/subsurface pipe scheme addressed in our November 1990 report.

PROJECT BACKGROUND

The Ash Grove Cement West Seattle plant manufactures cement using clinker brought in by barge or rail, for both bulk shipments and bagging.

Stoneway Concrete operates a ready-mix batch plant in a former parking area on the east side of the property. The Ash Grove facility produces roughly 270,000 tons of cement annually (1987 estimate), while Stoneway processes 880 cubic yards of concrete per day (1990 estimate).

Currently, stormwater runoff generated at the facility is routed over the surface and through a fairly elaborate piping system to a holding pond located adjacent to the east bank of the Duwamish Waterway.

Bearing cooling water, truck washout and occasional closed circuit cooling make-up and overflow waters are also discharged to the pond from the Ash Grove facility. Additionally, ready-mix truck washout not used in the Stoneway recycling/re-use process is diverted to the pond area. Pond water has been recycled into the cement process in the past and was also used for dust suppression and lawn irrigation around the facility. Since the

installation of a cooling tower in 1969, only 3% of the cooling water now goes to the pond.

The collected pond water is detained in the pond before slowly seeping into the adjacent soils and out of the pond. Water collected in the pond is treated through the addition of pH-neutralizing agents (sulfuric acid) which buffer the high pH evident in some of the process waters. The pond also acts as a settling basin.

DRAINAGE REGULATION

The Ash Grove pond is regulated by the Washington Department of Ecology under State Waste Discharge Permit 5162. Since 1964, the facility has maintained this permit which allows for discharge via seepage to the Duwamish and groundwater.

Stoneway manages their waste water utilizing on-site treatment with heavy emphasis on recycling and re-use. Occasionally, excess waste water must be discharged to the Ash Grove pond for further treatment and disposal.

Stoneway currently leases from Ash Grove and has the right to drain into existing Ash Grove lines and connect to the storm drainage system. They may also discharge into the pond and pay their prorated share of pond maintenance cleaning.

Prior to 1989, Ash Grove paid no fee for their state waste discharge permit. However, Washington Department of Ecology Initiative 97 changed that dramatically. WDOE I-97 requires DOE to fully recover all eligible costs of operating the state point source waste water discharge permit program. Currently, Ash Grove pays $8,000 per year for this fee, based on a permitted flow of 214,100 gallons per day. (Additionally, a City Stormwater Runoff fee is paid, although the City drainage system is not currently utilized). Ash Grove has considered applying for a permit change which would limit the permitted outflow to 50,000 gallons per day. This could be accomplished because the permitted flow of 214,100 gpd may represent a value that is more than ten times that of the actual flow. Such a permit reduction would save $6,000 per year. However, this permit modification has not been pursued due to the future procedural complexities which might result; should a flow increase eventually be required, the regulatory procedure would be very difficult.

As previously discussed, Stoneway has agreed to share the pond costs with Ash Grove. When Stoneway terminates use of the pond, their share will also cease. As a possible mean towards this end, Stoneway obtained a "Special/Minor Discharger" permit in 1990 to discharge to the Municipality of Metropolitan Seattle (Metro) public system. Metro Discharge Permit #232 allows for a

limited discharge (10,000 gpd) into the Metro combined sewer system.

Essentially, this permit allows Stoneway to discharge excess waste water to Metro. Currently, Stoneway has not tied into the public system and continues to discharge overflows to the Ash Grove pond.

Ash Grove is considering the development of the pond area and possibly intends to fill the existing pond.

Thus, a scheme needs to be developed which will provide an adequate storm/waste water disposal solution to replace the existing pond system. Several such schemes are discussed and evaluated below.

Alternative #1: DRYWELL

In a previous report (November 1990), an analysis was made relative to the design of a subsurface "drywell" consisting of buried corrugated metal pipe and clean drain rock. We refer you to this report for a detailed analysis. For the purposes of this study, the following table summarizes pertinent items:

TABLE 1

DRYWELL DESCRIPTION

DRYWELL AREAL DIMENSIONS: 200' x 104'
EFFECTIVE DEPTH OF DRYWELL: 5.5'
PIPE SIZE AND TYPE: 63" x 87" CMP PIPE ARCH
GALVANIZED/PERFORATED 14 GA
PIPE CROSS SECTIONAL AREA: 32.1 SF
PIPE LENGTH: (11) - 200' DISTRIBUTION PIPES
(1) - 104' HEADER
TOTAL PIPE LENGTH: 2,304 LF

TOTAL VOLUME OF EFFECTIVE EXCAVATED AREA:
200' x 104' x 5.5' = 114,400 CU. FT.
PIPE VOLUME: 73958 CU. FT.

RESIDUAL VOLUME: 40,442 CU. FT.
VOID SPACE (30%): 12,132 CU. FT.

TOTAL VOLUME AVAILABLE: 86,090 CU. FT.
= VOLUME AVAILABLE IN PIPE & DRAIN ROCK VOIDS

While this layout was undertaken to satisfy City of Seattle drainage conditions associated with adjacent on-site development, it was designed to maintain consistency with the DOE permit. Namely, the proposed volume/discharge relationship was developed to match as closely as possible that which currently exists. Approximate costs of such a project are summarized below:

TABLE 2

DRYWELL COST ESTIMATES

Fill Pond to Bedding Depth	$37,500
Excavate Additional Area	$5,000
Install Pipe/Bedding	$244,200
Install Drain Rock, Comp.	$27,300
Install Crushed Rock Cover (2', Comp).	$23,400
End Plates for CMP	$4,600
Install Fabric	$2,000
Settling Basin	$12,000
Treatment Basin. (pH Control)	$10,000
SUB TOTAL	$366,600

Alternative #2: DISCHARGE TO PUBLIC SYSTEM

The City of Seattle and Metro maintain public sewer systems east of the project site in East Marginal Way South. The availability and close proximity of those utilities to the facility offer a reasonable alternative to the pond. However, because the Metro line is an old combined sewer (sanitary and storm flows) and may be replaced sometime in the future with a sanitary-only line, combined flows are being discouraged. Thus it is necessary to separate stormwater flows from any process flows and discharge separately into Metro and the City storm sewer.

The City of Seattle regulates the public storm sewer system in Marginal Way. This system flows south to north along the east edge of the Stoneway facility. A fifteen inch trunk runs parallel to the east property line for approximately 300'. A manhole located approximately 130 feet south of the northeast property corner joins the fifteen inch pipe with one eighteen inches in diameter. This pipe directs storm flows northward, away from the site.

Neil Thiebert, City of Seattle "Drainage and Wastewater Engineer, had his staff evaluate this system for capacity. Sylvia von

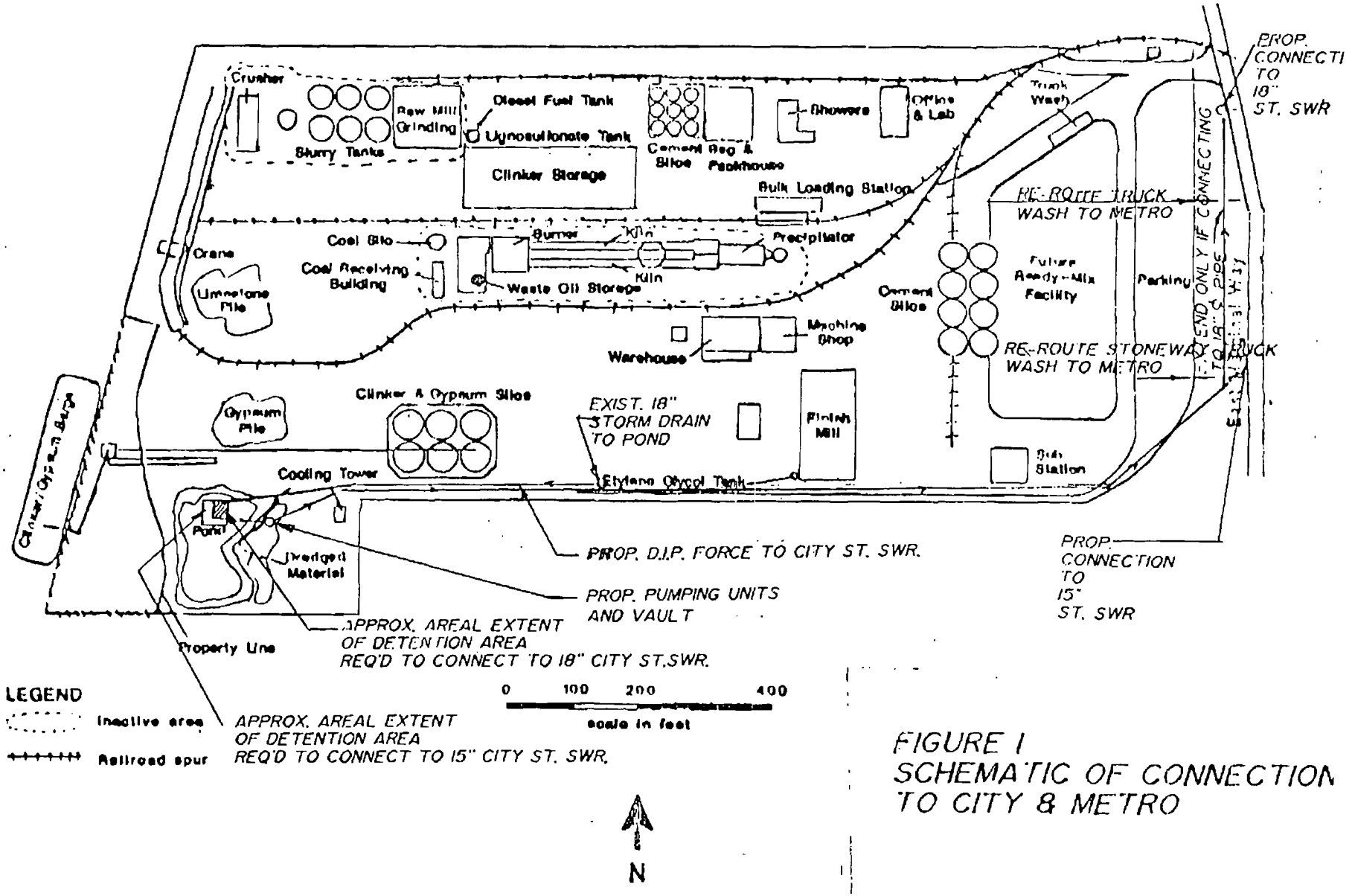

FIGURE 1
SCHEMATIC OF CONNECTION TO CITY & METRO

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Aulock, (Assistant Civil Engineer) performed this analysis (see attached letter), which established discharge limits for each pipe. If the site stormwater drainage is directed to the 15" diameter pipe, the release rate will be limited to 2.9 cfs. If the flows are connected to the 18" pipe, (greater capacity) on-site discharge is instead 6.9 cfs. This value is of great importance because it directly dictates what the detention volume requirement will be.

The City of Seattle has recently adopted a detention policy based on the Yrjanainen and Warren Method for stormwater detention analysis. Normally, a new development in Seattle is limited to a 0.2 cfs/acre stormwater release rate into a public storm sewer. In some instances where analysis proves otherwise, this limit can be increased or decreased depending on the capacity of the storm sewer trunk adjacent to the development. In this particular case, the 15" pipe is close to capacity and therefore we are limited to a 2.9 cfs release (or, roughly 0.13 cfs/acre). However, the 18" pipe has surplus capacity, and the allowable 6.9 cfs release rate equates to 0.31 cfs/acre. This is over one and one-half times the release allowed under normal conditions and results in a significant reduction of detention volume requirements. However, because the 18" line is located further from the pond than the 15" diameter line, an extra cost will be incurred to pipe the additional distance. The following will briefly summarize the costs associated with each pumping option.

Please note that all values are preliminary and were derived using City design procedure (see attached comps).

Option 2A: Pump Stormwater to 15" diameter City Storm Sewer

This option entails the construction of a subsurface, fully contained (and therefore outside of DOE jurisdiction) detention facility consisting of oversized 87" x 63" pipe arch. (This pipe size was chosen for the analysis to provide consistency with our previous drywell analysis). The overall layout of this detention facility would cover approximately 6960 square feet and could be fully contained in the existing pond excavation area. The proposed storm drainage system developed by Smith & Monroe & Gray would remain essentially unchanged; all runoff directed to the pond would instead collect in the subsurface pipe manifold system and be discharged to the City storm sewer through a pumped transmission line. This pressure line would lie adjacent to the existing pond discharge line but would flow the opposite direction. Figure 1 outlines the schematic layout of this option. Table 3 below summarizes costs and anticipated work items.

TABLE 3

COSTS ASSOCIATED WITH DIRECTING
STORM RUNOFF TO 15" CITY LINE

Release Rate	2.9 cfs
Peak 25-Yr Inflow	16 cfs
Detention Volume Required	29,900 ft3
Equivalent Length of 87" x 63" CMP Pipe Arch Required	932 LF
Pump Type	(3) Flyte Submersibles BS 2201
Pressure Line	1,405 LF 20 " dia D.I.P.
Pressure LIne Cost	$70,300
Cost to Fill Pond to Elev. 3.5'	$37,500
Cost to Install C.M. Pipe in Bedding	$81,000
Cost to Install Backfill (Compacted Pea Gravel)	$14,800
Pump Cost	3 @ $12,800 incl. controls: $38,300
Cost to Fill Remainder of Pond, Cover	$6,800
Misc. Costs (Pump Vault, (2) Manholes, 40' Grav. Line to City, Connect to City Manhole, Surface Resurfacing)	$10,000
SUBTOTAL	$258,800

Costs associated with directing waste water flows to Metro also apply here. (See below)

Option 2B: PUMP STORMWATER TO 18" DIAMETER CITY STORM SEWER

This option is identical to the one discussed above except for the final connection location. Because of the higher allocation release rate, less detention is required than for the 15" pipe. However, a greater length of pressure pipe is required to connect to the 18" line near the northeast corner of the property. Table 4, below summarizes anticipated costs and work items associated with this option.

TABLE 4

COSTS ASSOCIATED WITH DIRECTING
STORM RUNOFF TO 18" CITY LINE

Release Rate	.6.9 cfs
Peak 25-Yr Inflow	.16 cfs
Detention Volume Required	.12,500 cf
Pipe Length Required (63" x 87" CMP)	.390 LF
Pump Type	.(3) Flyte Submersible BS 2201
Pressure Line	.1,700 LF 20" dia. D.I.P
Pressure Line Cost	.$85,000
Cost to Fill Pond to Elev. 3.5'	.$37,500
Cost to Install C.M. Pipe	.$33,900
Cost to Install Backfill (Compacted Pea Gravel)	$5,800
Cost to Fill Remainder of Pond, Cover	.$18,500
Pump Cost	.$38,300
Misc. Costs (Pump Vault, (2) Manholes, 40' Grav. Line to City, Connect to City Manhole, Surface Resurfacing)	.$15,000
	$234,000

These costs will vary according to the exact location of the pressure line and the amount of resurfacing required in the area around Stoneway.

For either of the two previous options, the same City fees will be required. The following table outlines these fees.

TABLE 5

CITY OF SEATTLE FEE SCHEDULE (AS OF 1-91)

Complex Plan Review Fee	.$1,223
Side Sewer Permit Fee	.Obtained by side sewer contractor
Detention Installation Fee (covers inspection)	.$4,065

Any monthly drainage fees paid to the City of Seattle currently by Ash Grove would also apply.

CONNECTION TO METRO

As previously noted, the waste water currently discharging to the pond must be separated from the stormwater. This waste water should be discharged directly to the Metro 8" diameter sanitary trunk located in East Marginal Way. As we see it, the "waste water" under consideration is the truck wash runoff and Ready-Mix truck wash generated by Stoneway. Stoneway has already made application for a Metro limited discharge permit which allows Stoneway to direct overflows to Metro. The "cooling water" noted in the Ash Grove DOE permit can probably be discharged into the storm system without causing a problem, according to Mary Kautz (DOE) and Christie True (Metro Industrial Waste Section). A permit similar to that obtained by Stoneway would have to be secured for the Ash Grove truck wash area. According to Ms. True, the permit discharge would probably be classified as "high strength" due to the high amount of suspended solids evident in the decant basin water. If this were the case, Ash Grove would be assessed $0.108 per pound of suspended solids detected through monitoring. Ash Grove would have the option of paying a monitoring fee to Metro or providing independent monitoring through a "monitoring agreement" with Metro. Pretreatment probably will not be required (according to Ms. True), but it may be beneficial to explore this possibility. If pretreatment can bring the total suspended solids (TSS) of the discharge below 400 ppm, the "high strength" charge would be waived. The information available to us indicates that the decant basin runoff has TSS exceeding 1300 ppm. Depending on the permitted waste discharge, this may or may not result in Metro fees that would substantiate construction of a pretreatment basin to avoid long-term costs. Metro is working on getting us costs of similar facilities in Seattle to allow us to make this comparison.

There are two primary permit categories for industrial waste, based on magnitude of discharge. Major discharges exceed 25,000 gallons per day, while minor discharges are less than this. Please note that Stoneway already has a permit to discharge 10,000 gpm to Metro.

Metro informed us that the high pH evident in the Ash Grove waste water would probably not require pretreatment.

Table 6 outlines fees associated with Metro hook-up.

TABLE 6

METRO FEES (PER 4-91)

Permit Cost	$920
Public Notice Fees	$400 - $500
Monitoring Fee (if required)	Based on Discharge
"High Strength" Discharge Fee for TSS > 400 ppm	$0.108/lb suspended solids
Sewerage Fee	$14/900 CF sewerage
Connection Fee	Obtained by side-sewer contractor licensed in Seattle

Costs to construct facilities to connect to Metro would entail modifying the existing truck wash/overflow areas to pump directly to the 8" Metro line (located between 140 - 250 feet from existing decant areas). Costs depend on adequacy of existing pump/decant system and final piping layout. Without pretreatment, estimated costs are roughly $30,000 (400 LF pressure pipe, 2 manholes, 80 LF gravity line, connections to sanitary sewer, pump basin modifications).

DISCUSSION

The following table summarizes estimated costs for all three options:

Option	Estimated Construction Cost	+15% Overhead Contingencies	+10 Legal, Admin. Engineering
Drywell	$366,000	$421,000	$463,100
Connect to 18" City Storm & 8" Metro Combined	$264,000	$304,000	$334,400
Connect to 15 City Storm & 8" Metro Combined	$289,000	$332,000	$365,200

The connection to the 18" storm sewer appears to be the least expensive option in items of up-front cost. Because of the relatively similar costs for both connection options, either alternative may be used, depending on how the location of the 20" D.I.P. can be installed in the vicinity of Stoneway.

The relatively large size of the pressure pipe and the pressure of three pumps in this design can be attributed to the City

standard requiring that the 25-year peak inflow (Q = 16 cfs) be passed. We may be able to work with the City to develop a satisfactory overflow design which would result in a smaller discharge pipe and fewer pumps. The costs shown in Tables 3 and 4 represent a fairly conservative pump design.

From a performance standard, the subsurface piping/pumping system is more reliable and better likely to satisfy the City of Seattle, which has a fairly negative position toward drywell facilities. Further, it is fully contained and would allow Ash Grove to discontinue the DOE permit conditions and associated fees.

Annual costs will be dependant upon maintenance costs as well as Metro fees which are based upon waste discharge and characteristics.

We talked to both Metro & DOE regarding stormwater National Pollutant Discharge Elimination System Permits (NPDES permits). These are beginning to be issued, but Metro and DOE implied that the United States Environmental Protection Agency is not providing the necessary guidance to the local agencies to get the program moving. Mary Kautz (WDOE) informed us that currently, DOE is reviewing "Form 2F" applications and apparently approving them without too much delay. She also implied that after November 1991, the NPDES permitting procedure will "tighten up" significantly. It appears that Metro will be responsible for all NPDES discharges into the public system. Ms. Kautz was of the opinion that if the storm flows are separated from the waste flows, an NPDES permit would not be required.

We appreciate your cooperation and patience throughout this project.

Please do not hesitate to call our office if you have any questions regarding this analysis.

Sincerely,

KLEIN CONSULTING ENGINEERS, INC.

Dan Keppen

DK:rw

APPENDICES